Departmental Rotations
Pharmaceutical Services

Using the objectives listed below as a **guide** will help you to have a successful rotation in this department. Please remember that you are a visitor in an actual work environment and that patient safety and comfort are the priority of your preceptors. Your visit may be interrupted if they become very busy, please wait patiently until they are free to resume working with you.

Pharmaceutical Services is involved with the delivery of medications to patients. Pharmacists are charged with the tasks of consulting with physicians and nurses to determine the best medicinal therapy for each patient, and, double checking all facets of medication delivery to the patient. Pharmacy Technicians prepare and distribute medications under the supervision of a Pharmacist. The Technician also provides for a double check of the pharmacists work, for example, a math calculation of a dose.

Rational therapeutics, or the rational delivery of medications to patients, refers to the delivery of the correct drug to the correct patient in the correct dose at the correct time for the least amount of money.

OBJECTIVES

At the end of this rotation each student will be able to:

- Name each area of the hospital pharmacy department.
- Identify the purpose of each pharmacy area.
- Describe the roles of Pharmacy Technician and Pharmacist in the hospital environment.
- Identify the math skills needed in the pharmacy department.
- Identify how computers are used in the pharmacy.
- Describe the purpose of physicians orders.
- Define "unit dose".
- Describe the process for delivery of unit dosed medications.
- Explain how IV drugs are stored and prepared.
- Describe the precautions necessary in manufacturing chemotherapeutic drug doses.
- Describe the process for the manufacture of hyperalimentation solutions.

During this rotation the student will observe:

- The central pharmacy, a satellite pharmacy, the IV additive area, and the stock room area.
- Medications being prepared for patients.
- The computers, compounding, IV additive, and measuring equipment used in the pharmacy.
- The documentation required in pharmacy practice.

During this rotation students will have the opportunity to ask questions about:

- The activities that occur in the central pharmacy, the satellite pharmacies, the IV additive area, and the store room.
- The facilities and equipment used in pharmacy.
- The job responsibilities and educational requirements for pharmacy positions.

Career Exploration Rotation
Student Evaluation of Rotation

Student Name	School	Date

Facility	Department

1. How would you rate your overall visit to this department? (Circle the number that most closely represents your opinion.)

1 2 3 4 5 6 7 8
Poor Excellent

2. To what degree did your career exploration supervisor/mentor make you feel welcome? (Circle the number that most closely represents your opinion.)

1 2 3 4 5 6 7 8
Poor Excellent

3. To what degree was your career exploration supervisor/mentor prepared to answer your questions? (Circle the number that most closely represents your opinion.)

1 2 3 4 5 6 7 8
Poor Excellent

4. What part of the rotation was most interesting?

_____

_____

5. Write down one interesting lesson, or new fact you learned, while at this department.

_____

_____

6. Write down the name of the class at school in which you might learn more about the interesting lesson in question 5, above.

_____

7. Comments:

_____

_____

Career Exploration Rotation
Staff Evaluation of Rotation

Student Name	Supervisor/Mentor	Date

Facility	Department

1. Would you want this student back in your department? Yes No Briefly Describe (circle one)

_____

2. How would you rate the students' overall visit to this department? (Circle the number that most closely represents your opinion.)

1 2 3 4 5 6 7 8
Poor Excellent

3. The students' attitude during this visit was: (Circle the number that most closely represents your opinion.)

1 2 3 4 5 6 7 8
Poor Excellent

4. How would you rate the students' interest in your department presentation? (Circle the number that most closely represents your opinion.)

1 2 3 4 5 6 7 8
Poor Excellent

5. Did the student ask questions that showed they were engaged with your presentation? (circle one) Yes No

6. Was the student cooperative? (circle one) Yes No Briefly Describe

_____

_____

7. Would you like to continue to have students rotate through your department? (circle one) Yes No Briefly Describe

_____

_____

8. Comments:

_____

_____

Career Exploration Rotation
Pharmaceutical Services
Student Questionnaire

Student Name	Department Supervisor	Date

1. What is the purpose of the central pharmacy?

   The purpose of the central pharmacy is to provide:
   - *a) Inventory support to the satellite pharmacies*
   - *b) IV antibiotic preparation for the hospital*
   - *c) TPN preparation for the hospital*
   - *d) IV chemotherapy preparation for the hospital*

2. Why do hospitals have satellite pharmacies?

   Satellite pharmacies allow for more rapid communication between the nurses care for patients and the pharmacy department. In addition, the satellite increases the access to the physician and patient data for the pharmacist monitoring drug therapy.

3. What are some of the specialty practice areas of the satellite pharmacies?

   The specialty practice areas for satellite pharmacies include:
   - *a) Pediatrics*
   - *b) Oncology*
   - *c) Cardiology*
   - *d) Neurology*
   - *e) Neonatology*
   - *f) Nephrology*
   - *g) Orthopedics*
   - *h) Endocrinology (Diabetes Care Unit)*
   - *i) Transplant Services*
   - *j) Intensive Care Units that support all of the above practice areas*

4. What precautions are needed when preparing chemotherapeutic agents?

   Essentially, reverse isolation. The person preparing the chemotherapeutic agent must remain isolated from exposure to the agent. This is to prevent exposure of the worker to the potential of hazardous, cytotoxic, materials.

5. What is a physician's order? How does it relate to the practice of pharmacy?

A physician's order is a page in the patients chart (a chart is the collection of all documentation of what happens to a patient, and why, during their stay in the hospital, for legal purposes) where the physician orders treatments and medications for the patient. These physician's orders are then treated by the pharmacy of the hospital just like a prescription in a community pharmacy. They authorize the pharmacist to dispense medications from the pharmacy for use by the patient. In a hospital, the medications may be given to a nurse to, in turn, be given to the patient.

6. What kind of patient records are maintained by the pharmacy? Attach an example of one of these records (preserving patient confidentiality) to this page.

The pharmacy maintains a record of the patients drug history. This history includes any medications the patient had been taking prior to admission to the hospital, any drug allergies the patient might have, pertinent data from the patients physical exam (like age, height, weight, sex, and diagnosis), and a complete listing of all medications the patient has received during their hospital stay.

7. Describe how these records are utilized by the pharmacy staff.

These records are used to make a determination of compliance with the principles of rational drug therapy. Are the most cost effective medications being used to treat the patient? Are there multiple medications for the same condition ordered by different physicians? Are the amounts of medications ordered appropriate for the individual patient? In addition, this record allows for the legal documentation of the pharmacists activities in monitoring patient care.

8. List two different times you saw math used in the pharmacy. For each time, write the job title of the person using the math skill, and the medication they were working on.

Answers may vary.

9. Are computers used by employees in pharmacy? If so, name at least one way they are used. Attach a printout from one of the computers.

Computers are used throughout the pharmacy. Answers to use may vary.

10. Name at least four medication dose forms.

Medication dose forms include: tablet, capsule, suppository, cream, ointment, aerosol, injectable solution, oral solution, oral suspension, elixir, syrup, tincture, powder, ophthalmic solution, and ophthalmic suspension.

11. Define the following terms:

- Pharmacology: *The science that deals with the origin, nature, chemistry, effects, and uses of drugs.*

- Pharmacokinetics: *The action of drugs in the body over a period of time, including the processes of absorption, distribution, localization in tissues, biotransformation, and excretion.*

- Sublingual, SubQ, IM, IV, IVPB, IT: *Sublingual refers to placement of medication under the tongue for absorption into the capillaries of the tongue. SubQ refers to an injection just under the skin, but not into the muscle or vessel. IM refers to an injection into the belly of a muscle. IV refers to an injection into a vein. IVPB refers to the infusion of a small volume (usually under 500cc) of solution containing medication into a vein. IT refers to an injection into the thecum, that is to say, one of the ventricles of the brain.*

- Piggyback: *Refers to the practice of running one or more additional IV lines into a main, or primary, IV site in a patient.*

- D5W: *D5W refers to a solution of 5% dextrose in water.*

- NS: *NS refers to a solution of 0.9% Sodium Chloride (NaCl) in water. This solution is referred to as being "Normal" because this is the same concentration of salt found in the blood.*

- SWFI: *SWFI refers to Sterile Water for Injection. This is rarely, if ever, injected into a patient. The use of SWFI is in the reconstitution of sterile powders for injection into a solution or suspension, which is then injected into the patient.*

- STAT: *STAT represents an abbreviation of the Latin word Statim, which means immediately. In medical usage, STAT is taken to mean that there will be dire consequences to the patient if whatever is ordered STAT is not accomplished within three to five minutes.*

- ASAP: ASAP represents an abbreviation of the phrase As Soon As Possible. In medical usage, ASAP is taken to mean that there will be dire consequences to the patient if whatever is ordered ASAP is not accomplished within thirty to sixty minutes.

- Cassette: The term cassette, as used in the pharmacy, refers to the small drawer in which a twenty-four hour supply of medication for an individual patient is placed.

- Pharmaceutical Care: Pharmaceutical Care is a term that refers to the entire scope of patient care provided by the pharmacy. This means everything from the

movement of medications from inventory to the patient to the adjustment of medication dosages to better meet the individual needs of the patient.

- Hyperal/TPN: Hyperal/TPN are abbreviations of the terms Hyperalimentation and Total Parenteral Nutrition. Hyperalimentation refers to the ingestion or administration of a greater than optimal amount of nutrients. Total Parenteral Nutrition refers to administration of nutrients not through the alimentary canal, but rather by injection through some other route.

12. What factors determine the dosage of a drug in a particular patient?

Individualization of drug dosages in a patient takes into account patient specific parameters. These parameters include the patients age, sex, height, weight, smoking history, drinking history, the route of administration for the drug, the location of the body the drug is to be delivered, and the function of the liver and kidneys of the patient. All of these patient specific factors will determine the rate of drug localization within the patient and the rate of elimination of the drug from the patient.

13. Compare and contrast the terms "trade name" and "generic name" for drugs.

Most drugs marketed in the United States have two names. The first is the name the discoverer gave the drug. This is referred to as the Generic Name. The second is the name that the marketing department of the drug company selling the drug gives to the drug. This is referred to as the Trade Name. The same drug, with its original name, may have several trade names, depending on how many drug companies are trying to sell the drug. An example of this would be the drugs Amoxil®, Polymox®, Wymox®, and Trimox®; all of which are trade names by different manufacturers for Amoxicillin, a penicillin antibiotic.

14. What is the proper method for discarding old medications. When should this be done?

Expired medications are best disposed of by either flushing them down the toilet, or by pouring them down a sink, with running water. This should be done anytime the medication is older than the expiration date on the label of the container.

15. Why are medications stored in a refrigerator?

Medications are stored in the refrigerator to increase their shelf life. Some chemical compounds are relatively unstable at room temperature, therefore, they are refrigerated to slow the rate of breakdown.

16. Define the terms "shelf life" and "expiration date".

Shelf life refers to the amount of time the medication will remain stable in its packaging. Expiration date refers to the date after which the drug should be considered to be unusable. The expiration date is the maximum date after manufacturer of the drug, as dictated by its shelf life.

17. How may the shelf life of a medication be extended?

There are two major factors affecting shelf life. The first is the stability of the chemical(s) contained within the drug product. The second is the packaging of the drug product. The shelf life of most manufactured drug products may be extended by storing the product in a cool, dark, dry location. Any combination of water, light, and heat may cause degradation of chemicals and/or packaging materials.

18. Why are some medications given only through blood vessels, rather than by a spoon, medicine dropper, pill, or capsule?

Many drugs are altered by the liver, and its enzymes, into inactive forms very quickly. The vascular system of the body transports virtually all absorbed substances from the intestines directly to the liver (via the hepatic portal vein). If a drug is rapidly metabolized by the liver, then no usable drug will get to the rest of the body if it is given orally. Therefore, the drug must be administered by some other route than oral.

19. What is a laminar flow hood?

Laminar flow refers to the movement of a substance at a uniform speed and direction throughout its volume. In the case of a laminar flow hood, the substance in question is air. Within the confines of the hood the laminar flow means that all of the air in the hood is moving at a uniform speed and direction. In most laminar flow hoods the direction is horizontal, from the hood out into the room, across the work surface. Specialized hoods have a vertical flow from above the work surface to below the work surface to help assure that no particles will be blown into the face of the workers using the hood.

20. Give the job responsibilities and educational requirements for each of the following workers within the Pharmacy Department:

Pharmacist: The job responsibilities include the delivery of safe, effective, cost effective, therapeutic regimes to the patients in their care. They fulfill these responsibilities by double checking physician orders, pharmacy technicians, and nursing staff to assure that the correct dose of the correct drug is given to the correct patient at the correct time.
The educational requirements to become a pharmacist in the state of California are: two years of college, followed by four years of pharmacy school ending in a Doctor of Pharmacy degree.

Pharmacy Technician: The job responsibilities include the approval of the supervising pharmacist, to prepare and distribute the medication doses ordered by the physician to the nursing staff for administration to the patient. The educational requirements to become a Pharmacy Technician in the state of California are: a high school diploma and some vocational training as a pharmacy technician.

21. What high school courses should you be taking if you want to work in the Pharmaceutical Services Department?

The high school courses a person should take if they want to work in Pharmaceutical Services are Anatomy and Physiology, Biology, Math, Chemistry, and Physics. Answers may vary.

22. If you have taken one of the courses listed above, give one example of how something you learned in the class was used in Pharmacy.

Answers may vary.